

## REMARKS

Claims 1-18 have been examined and rejected. The present response amends claims 1, 8, and 14 and cancels claims 2-3, 9, and 15. Accordingly, claims 1, 4-8, 10-14, and 16-18 remain pending. Reconsideration and allowance of all pending claims are respectfully requested.

Claims 8-12, 14, and 16-18 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,292,288 issued to Akasaka, et al., (hereinafter "Akasaka") in view of Pub. No. 2002/0021864 by Emori, et al., (hereinafter "Emori"). It is respectfully submitted that these references will not sustain a *prima facie* basis for the rejection and that the rejection should therefore be withdrawn. The amendments to claims 8 and 14 are for purposes of clarification and are not necessary to distinguish over the cited art.

A *prima facie* case of obviousness requires: 1) that there must be some suggestion or motivation, either in the references themselves or in the knowledge of one of ordinary skill in the art to modify or combine the references, 2) there must be a reasonable expectation of success, and 3) the combined cited references should teach the claimed invention. MPEP 2142

As a threshold matter, the combined cited references do not teach the claimed invention. They do not teach that N pump wavelengths and N+1 pump wavelengths alternate in order of wavelength between two directions of injection into a fiber, a requirement of independent claims 8 and 14. The rejection points to Emori for the teaching of N pump wavelengths being used in a co-propagating direction and N+1 pump wavelengths being used in a counter-propagating direction. Emori, however, does not teach that the wavelengths alternate between the two pumping directions in order of wavelength. In Emori, the consecutive pump wavelengths 1450 nm and 1490 nm are injected in the same direction, counter-propagating. The rejection of claims 8 and 14 asserts that Akasaka teaches all the features found in Emori except the use of N pump wavelengths in one direction and N+1 pump wavelengths in the other direction but does not indicate where in Akasaka one might find disclosure or suggestion that the pumps alternate in wavelength order. To the contrary, Akasaka teaches that the pump wavelengths are the same in both the co-propagating and counter propagating directions. See column 14, lines 55-64.

The alternation in wavelength order between the two directions provides important advantages to embodiments of the present invention. For example, one can achieve advantageous gain flattening effects due to the compensation between the counter-propagating and co-propagating gains AND one can achieve those effects over the same bandwidth using a beneficially reduced number of pumps compared to an arrangement that duplicates pump wavelengths between directions. Furthermore, a smaller number of pumps can be used to extend the noise figure benefits of combining co-propagating and counter-propagating pump energy over a large bandwidth since pump energy is not duplicated on the same wavelength for each direction. Compensation and noise figure enhancement can be provided without substantial gaps by alternating wavelengths between directions. The failure of the cited art to disclose or suggest the use of alternating pump wavelengths in the two directions is sufficient reason for the allowability of claims 8 and 14 and the dependent claims 10-12 and 16-18.

Even contrafactually assuming that the cited references did in fact teach or suggest all of the features found in claims 8 and 14, they would still not support a *prima facie* case of obviousness. Where the pump wavelengths are identical in the co-propagating direction and counter-propagating direction, as they are in Akasaka, there is no advantage to be found in modifying to use N wavelengths in one direction and N +1 wavelengths in the other direction. In fact it is not even clear what the modification would be given the teachings of the two references. As a thought exercise, one could envision adding a pump wavelength to one of the directions so that the wavelengths would be identical between the directions except for the added one. This would not provide the advantages provided by embodiments of the present invention as explained above.

Because factors 1) and 3) of the *prima facie* analysis are dispositive in this case, factor 2) will not be discussed in detail. Claims 8 and 14 are allowable over the art of record. The cancellation of claim 9 moots its rejection. Claims 10-12 and 16-18 are allowable for at least the reason of their dependence from the allowable independent claims.

Claim 13 and 15 have been rejected under 35 U.S.C. §103(a) as being obvious over Akasaka in view of Emori and further in view of Namiki, et al, "Ultrabroad-Band Raman Amplifiers Pumped and Gain-Equalized by Wavelength-Division-Multiplexed High-Power Laser Diodes." The cancellation of claim 15 moots its rejection. Claim 13 depends from allowable

claim 8. The Namiki, et al, reference does not remedy the deficiencies of Emori and Akasaka as explained above. Claim 13 is therefore allowable over the art of record.

Claims 1, 3, and 4 have been rejected under 35 U.S.C. §102(e) as being anticipated by Emori. To expedite prosecution, independent claim 1 has been amended to recite "said distinct pump wavelengths alternating in order of wavelength between said first group and said second group." As explained above this feature is neither disclosed nor suggested by Emori. This is sufficient reason for the allowability of claim 1. The cancellation of claim 3 moots its rejection. Claim 4 is allowable for at least the reason of its dependence from allowable claim 1.

Claim 5 has been rejected under 35 U.S.C. §103 as being unpatentable over Emori. Claim 5 is dependent from claim 1 and thus recites the same feature specifically discussed with reference to claim 1. Claim 5 is thus allowable for at least the reason of its dependence from claim 1.

Claims 2 and 7 have been rejected under 35 U.S.C. §103 as being unpatentable over Emori in view of Namiki. The cancellation of claim 2 moots its rejection. Claim 7 depends from claim 1 and thus recites the same feature specifically discussed with reference to claim 1. The Namiki reference does not remedy the deficiencies of Emori. Claim 7 is therefore also allowable over the art of record.

#### Conclusion

For the foregoing reasons, Applicant believes all the pending claims are in condition for allowance and should be passed to issue. If the Examiner feels that a telephone conference would in any way expedite the prosecution of the application, please do not hesitate to call the undersigned at (408) 446-8694.

Respectfully submitted,



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